



# Cleaner Technology & Energy Efficiency

## April 5, 2007

BUILDING BUSINESSES  
**ONE DROP** AT A TIME



**FUJIFILM Dimatix, Inc.**  
**Printing Products**  
109 Etna Rd.  
Lebanon, NH 03766

**[www.dimatix.com](http://www.dimatix.com)**





# Agenda

- Corporate Profile
- Markets and Applications
- Textile Printing
- Underlying technology
- Ink/Fluid Sources
- Summary



# Company Profile

- **Designs & manufactures piezoelectric, drop-on-demand ink jet printheads, micropumps & systems for industrial applications**
  - OEM Jetting Component (JC)
  - Integrated systems solutions (DTI)
  - Materials Deposition Products (MDP)
- **Founded 1984**
  - Corporate Office in Santa Clara, CA
  - Operations in Lebanon, NH
  - Advanced R&D and MEMS facility in Santa Clara, CA
  - Continuous growth in products, applications and revenues
- **Acquired by FUJIFILM in July 2006, now FUJIFILM Dimatix, Inc.**





# Company Profile

- **New Hampshire Operations**
  - 250+ Staff
  - ISO 9001 Certified - 2000 Standard
  - 4-Class 100 Production Modules
- **Santa Clara, CA - Corporate Offices & Complete MEMS fabrication facility with advanced metrology in**
  - Deposition, etching, bonding, grinding & surface treatment, etc.
  - Proprietary process development
  - Production tooling
- **Significant patent portfolio**
  - >160 Applications & Issued US Patents
  - >500 Applications & Issued Patents Worldwide
  - Silicon MEMS
  - Carbon Structures





# Printing & Graphics



## Graphics

- Coding & Marking
- Outdoor and Indoor Signage
- Point-of-Sale Displays
- Addressing and Postal
- Decorative
- Textiles
- Packaging
- Wall & Floor Coverings
- Commercial Printing
- Screen Masking



Durst Rho 160



VUTEk  
PressVu 200/600



Versamark  
Passport  
4300

Mutoh NXPro  
Toucan



Gandinovations Jeti



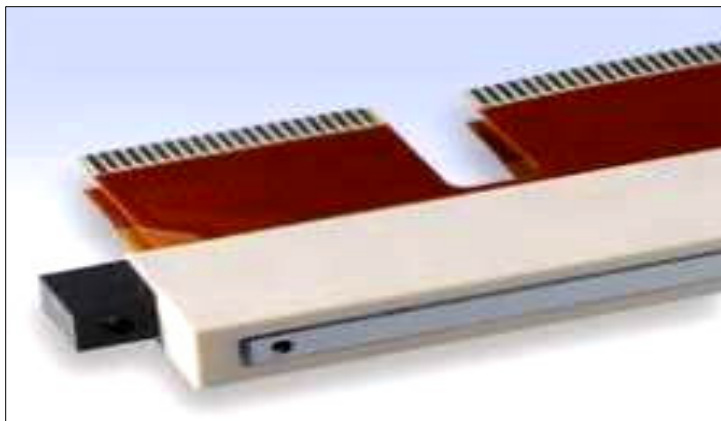
MARKEM 5000







# Materials Deposition



**SX3 Printhead**



**Pilot Deposition System**



**DMP-2800 & Cartridge**





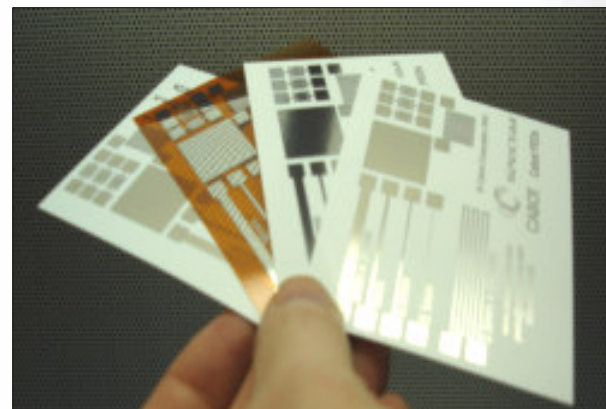
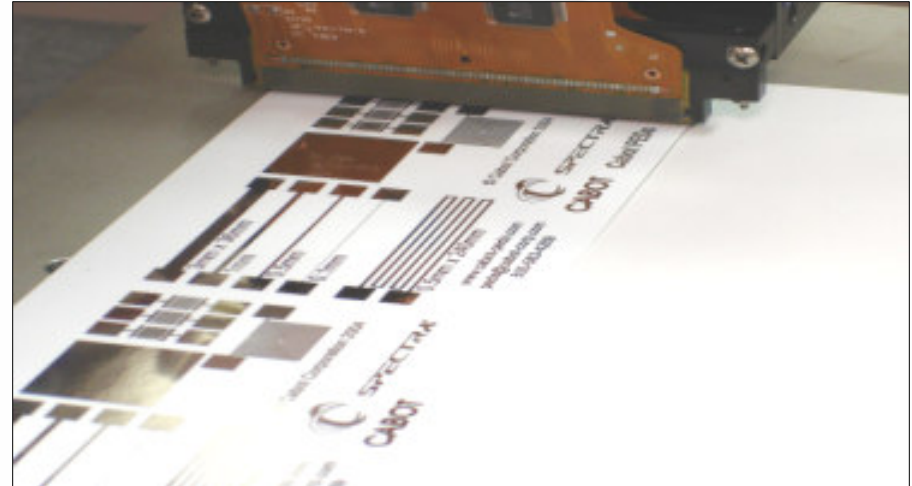
# Light Emitting Polymers & Conductive Metal Fluids Deposition



Full Color Passive



Full Color Active



Courtesy of: Philips Electronics

Courtesy of: Cabot/SMP

FUJIFILM DIMATIX, Inc. - April 5, 2007

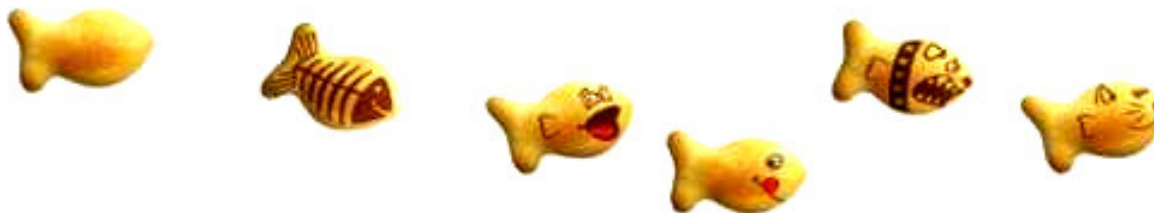




# Solutions for Industrial Applications



- Fully integrated system
- Decorate foods with photos, logos, text & clip-art
- Scalable to full production line speeds (>300 ft./min.)
- Customized solutions from standard components







# Image Directly onto Semi-solid Surfaces



Dairy

Cheese



Meats





# Merlin™

## Application: Industrial Product Decoration



### Duplex Printing





# Non-food Decorative Applications



## Pharmaceuticals



## Saw Blades



## Wood Grain





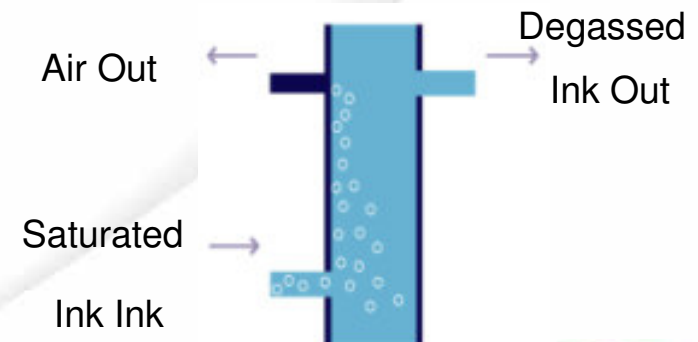
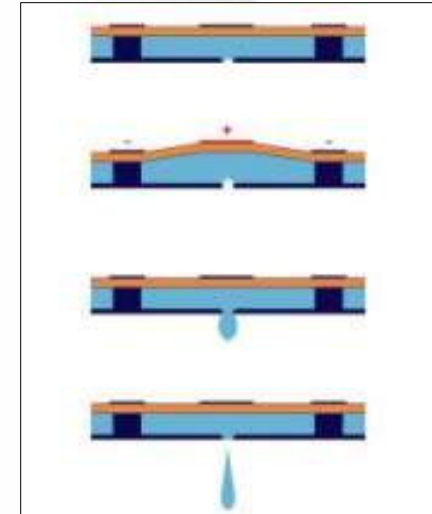
## Technology

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# Jet Actuation & Fluid Degassing Technology

- Many jet actuators using a single PZT for each channel
- All jets fired simultaneously
- Runs at high frequencies
- Supports a wide range of inks, colorants and viscosity
- Complete printhead tending components
- **Proprietary Degassing/Deaeration**
  - Fast start-up
  - Sustained high-speed jetting
- **Ensures products are:**
  - Simple
  - Reliable
  - Cost effective

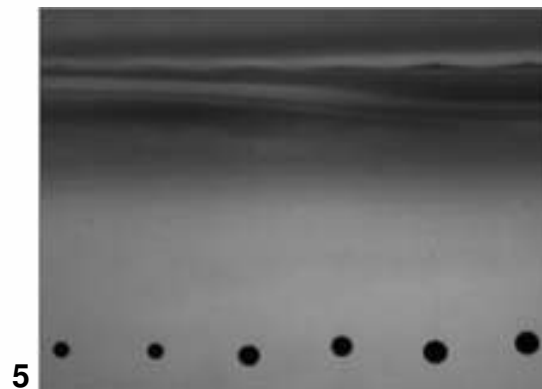
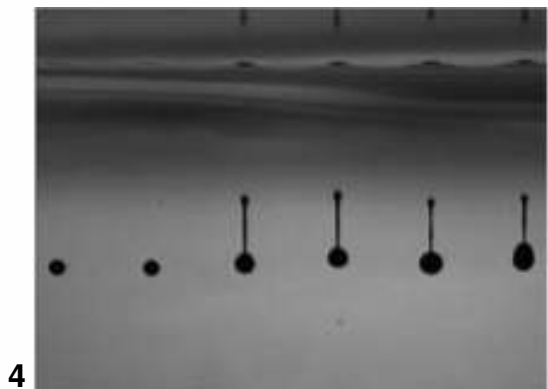
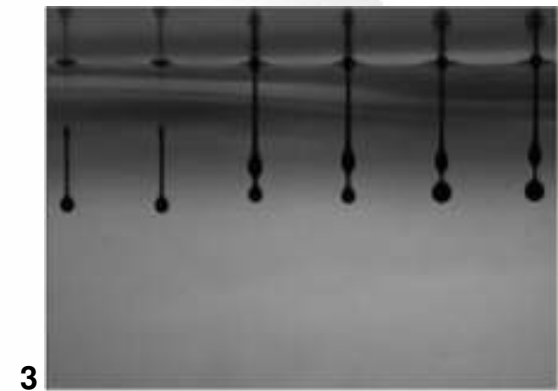
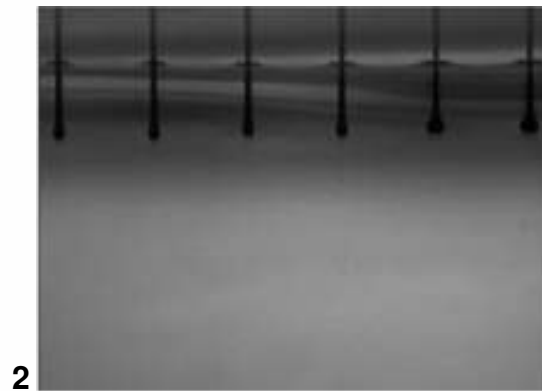






# VersaDrop Drop Size Modulation

- Speed of 3 different drop sizes (10, 20, 30ng) matched to land at same place on substrate





## Printheads, Assemblies & Systems





# Spectra™ Monolithic Printhead Products

- **M-300 Jet Module**

- 304 jets
- 10 pl native drop size
- Variable & programmable drop sizes
- Modules designed for easy replacement

- **Hex Printhead**

- Ready to use configuration
- Easy to integrate
- Includes electronics and fluid handling
- 6 Color, 180 dpi
- 1,824 jets





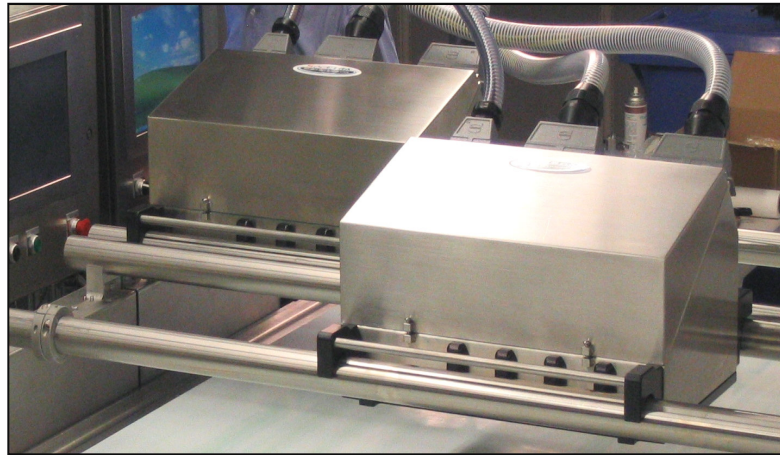
# Spectra™ Hybrid Printhead Products

- **Nova / Galaxy**
  - 256 Jets
  - 30, 50, 80 pl
  - Configured as Printheads or Jetting Assemblies
  - Multiple fluids supported
- **S-Class**
  - 128 Jets
  - 30, 50, 80 pl
  - Jetting Assemblies
  - Solvent and UV capable
- **Skywalker**
  - 128 Jets
  - 50 pl
  - Solvent





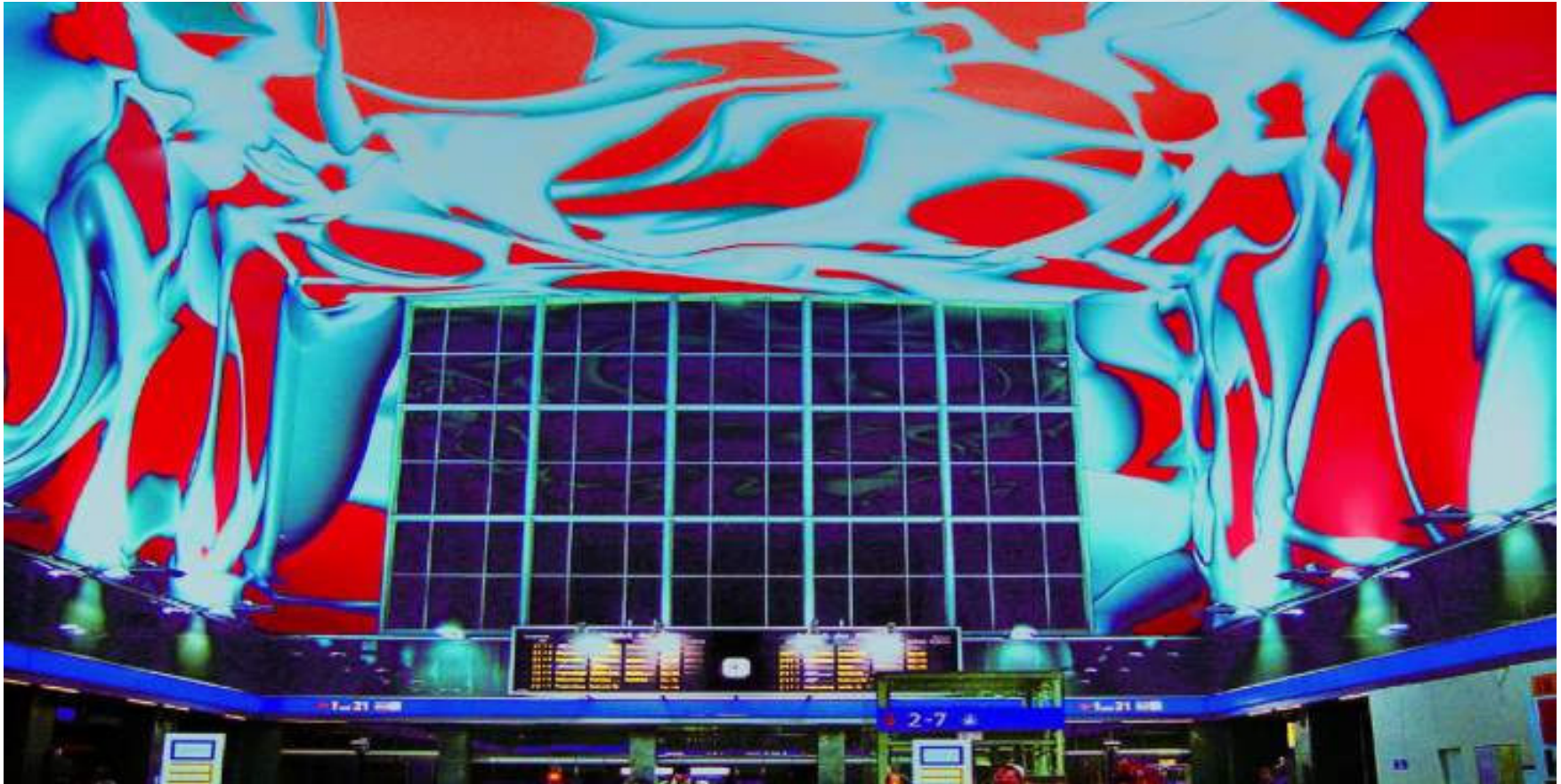
# Single Pass Printhead Clusters







# Textile Applications





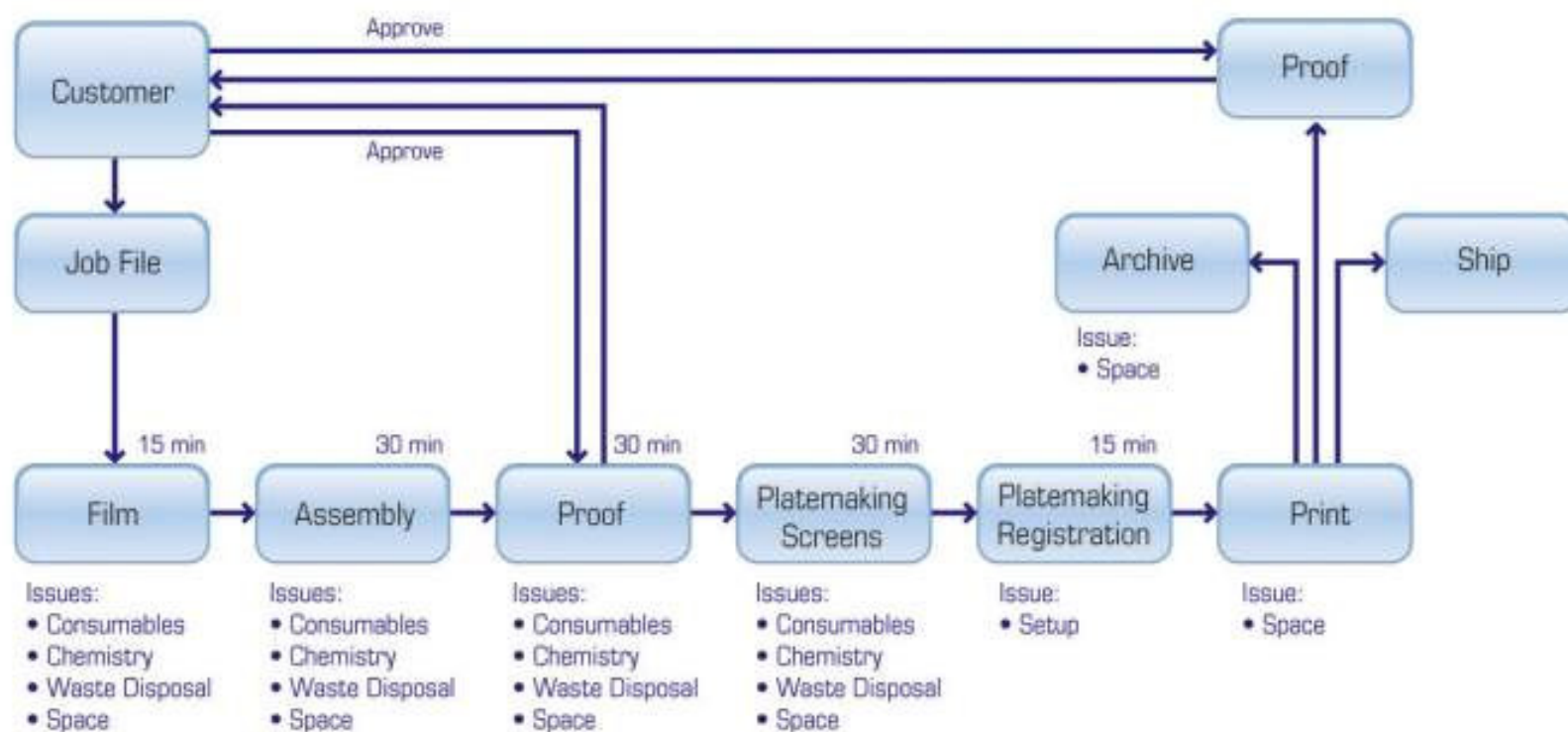
# Value Drivers for Digital Textile Printing

- Shorter run lengths and variable information
- Improved Supply chain efficiency
  - Just in time stock replenishment possible
  - Strike-off and sample lead times cut from 2-5 weeks to 1-2 days
  - Ability to rapidly alter and transmit designs electronically
  - New product creation



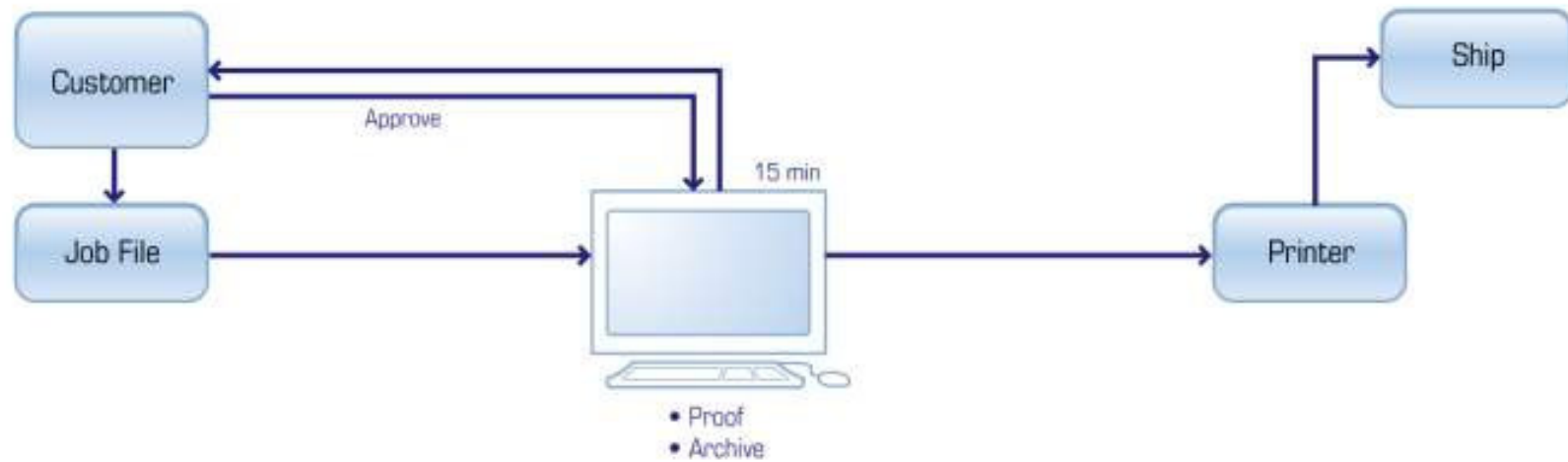


# Analog Workflow





# Digital Workflow





# Considerations

- Integrated Printing System
  - Printer
  - RIP Software & Color Management
  - Computer Integrated Manufacturing (CIM)
- Fabric Choice
  - Type & treatment
  - Paper backed (materials handling)
- Fabric Ink Set
  - Process Vs. Spot
  - Functional Fluid
  - Post processing equipment and supplies







# Textile Printing

- Wide range of ink formulation can work with Piezo Ink Jet
  - Stiff structure permits high ink viscosity
  - Pigmented and dye-based inks have demonstrated reliable operation
- Printhead life limited primarily by:
  - Orifice type (stainless steel for long life and volume consistency)
  - Stiffness of chambers (reduction/elimination of cross-talk)
  - Ability to jet a wide range of textile ink formulations
- High jetting frequencies for high throughput (20-40 kHz)
- Large drops for spot color, small drops for process color
- Grayscale for combination large and small drop printing
- Most printheads were designed for water based inks onto paper, now adapting acid, reactive and dispersed dyes





# Jettable High Viscosity Textile Inks

- Viscosity range of 10- 20 cps at temps from 30-140 C
- Higher loading of colorants and improved suspension
  - Improved color density
  - Improved color brightness
- Options for high viscosity water-based dye inks
- Dispersed dyes (pigments) in higher concentration
- Less water, high speed, lower drying requirements
- Options for UV-Curing





## Ink Partners

- Chimigraf Ibérica S.L.
- DuPont Ink Jet
- Fujifilm Sericol UK Limited
- Hexion Specialty Chemicals
- Inkware
- Konica Minolta Medical & Graphic, Inc.
- Sensient Imaging Technologies, Inc. - USA
- Sensient Imaging Technologies, S.A. - Switzerland
- SunJet
- Tetenal Ag & Co. KG





## Summary

- The leading supplier of industrial piezo ink jet technology
- OEM and systems strategy
- Substantial development & manufacturing expertise
- Highly experienced technical support and R&D teams
- Strong partnerships with leading ink manufacturers
- Components to complete systems

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